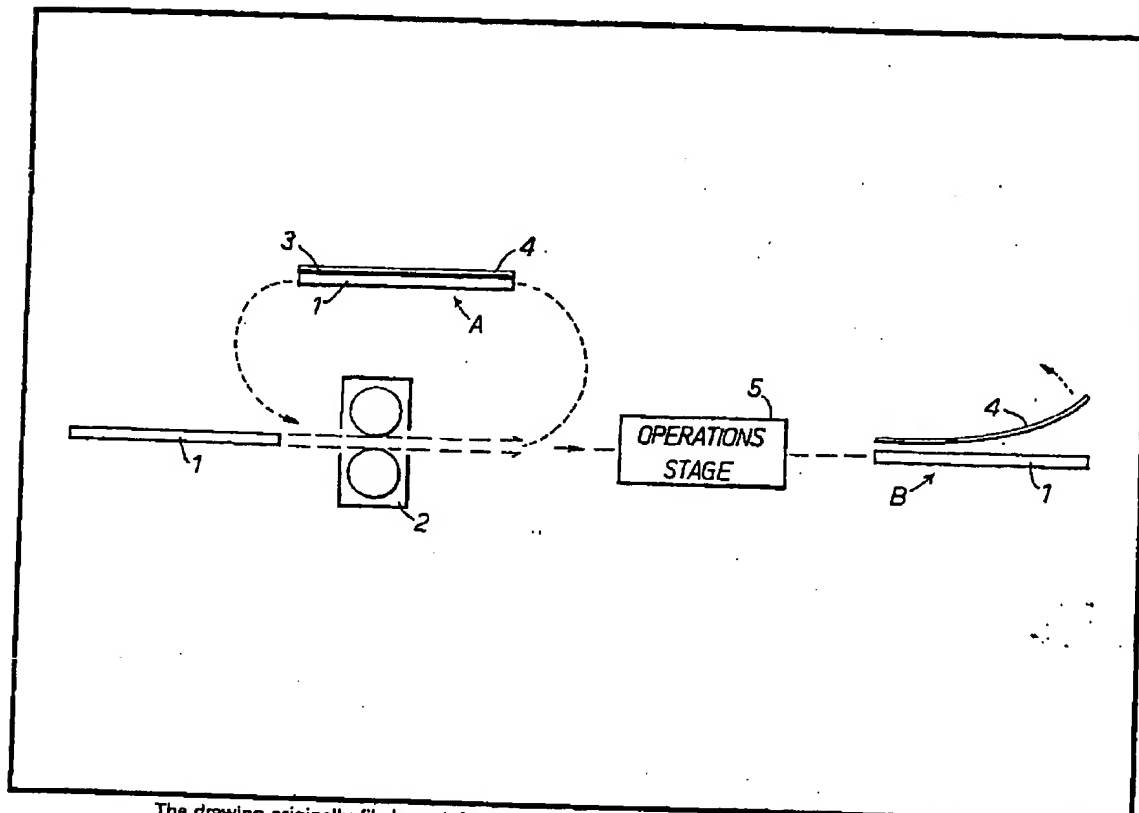


# (12) UK Patent Application (19) GB (11) 2 030 779 A

(21) Application No 7838301

(22) Date of filing  
27 Sep 1978(23) Claims filed  
27 Sep 1978(43) Application published  
10 Apr 1980(51) INT CL<sup>3</sup> H05K 3/00(52) Domestic classification  
H1R 10 21 AH(56) Documents cited  
GB 1457686  
GB 933385  
GB 724380(58) Field of search  
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to the manufacture of flexible  
printed circuits

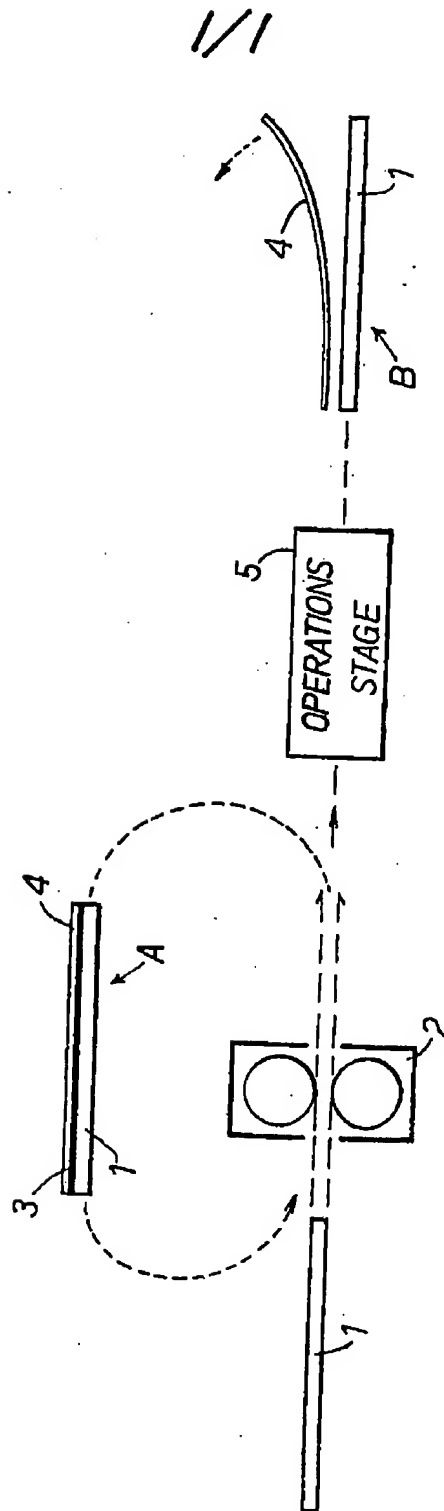
(57) A method of manufacturing a flexible printed circuit board comprising bonding, by means of a thermoplastic adhesive film, a sheet of flexible substrate material to a rigid base board of for example fibre glass, prior to processing the sheet to form a printed circuit. The flexible printed circuit board is then removed from the base board by peeling.



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The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

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## SPECIFICATION

Improvements in or relating to the manufacture of flexible printed circuits.

5 This invention relates to the manufacture of flexible printed circuits.

As is well known a flexible printed circuit consists of a sheet of relatively flimsy material quite commonly only 0.004" (0.1 mm approximately) thick upon which conductive tracks are provided by a printing process. The complete manufacture of a flexible printed circuit involves a number of processes including 10 cleaning, the photographic conductor forming process and often machining in order to provide patterns of holes. Due to the relative flimsiness of the material the handling during such processing is difficult.

20 Furthermore in order to save cost, a plurality of individual flexible printed circuits are normally processed upon a single blank of substrate material commonly 24" by 12" (61 cm by 30.5 cm approximately). Apart from the above-mentioned difficulty of handling it has also been found that during processing the substrate material shrinks—typically by 0.025" (.64 mm approximately) in 24" (61 cm approximately). This shrinkage leads to difficulty during final processing, e.g. screen printing or drilling carried out on the processed circuit since, unless due allowance is made—and this is difficult since the exact amount of shrinkage is difficult to predict in a 30 given case—the hole pattern and/or printing pattern does not line up with the formed circuit pattern.

The present invention seeks to provide a method of manufacturing a flexible printed circuit in which the above difficulties are reduced.

According to this invention a method of manufacturing a flexible printed circuit board comprises the step of bonding by means of a 45 thermo-plastic adhesive film, a sheet of flexible substrate material to a relatively rigid base board prior to processing said sheet to form a finished circuit from said base board by peeling.

50 Where machining operations are to be carried out, in order for example to provide a pattern of holes, such operations will also be carried out whilst said sheet of flexible substrate material is on said base board.

55 Preferably said base board is a panel of fibreglass or synthetic resin-bonded paper. A preferred thermoplastic adhesive material for use in bonding said substrate material to said base board is a photosensitive polymeric film.

60 The invention is further described with reference to the accompanying drawing which is highly schematic diagram illustrating the essential steps in the manufacture of a flexible printed circuit in accordance with the present 65 invention.

Referring to the drawing a sheet of fibre-glass 0.062" (1.57 mm approximately) 1 is passed through a suitable "hot roll" laminator 2 in order to apply a thermoplastic photosensitive polymeric adhesive film .002" (.05 mm approximately) thick as represented at (A). A sheet 4 of substrate material of which the flexible printed circuit is to be formed is then applied over the film 3 and the assembly is 70 once more passed through the hot rollers of the laminator 2 in order to achieve a satisfactory bond. It will be noted, of course, that in this second passage through the laminator 2 it is only the hot rollers thereof which are operative and no application of thermoplastic adhesive material is involved.

As represented by the block 5 the substrate material 4 is then processed to form the required conductive pattern on its surface and 85 any drilling or screen printing operations are then carried out on the processed circuit.

Finally as represented at (B) the finished flexible printed circuit is simply peeled off the base board 1.

90 It has been found that the use of thermoplastic adhesive material bonding the substrate 4 to the base board 1 results in the substrate 4 peeling off quite cleanly whilst at the same time the bond is sufficient to enable 95 adequate location of the substrate 4 on the base board 1 during handling and processing. The adhesion is also sufficient to prevent undue shrinkage of the substrate 4 during processing.

## CLAIMS

1. A method of manufacturing a flexible printed circuit board comprising the step of bonding, by means of a thermo-plastic adhesive film, a sheet of flexible substrate material to a relatively rigid base board prior to processing said sheet to form a finished circuit and subsequently removing the processed printed circuit from said base board by peeling. 105

2. A method as claimed in claim 1 and wherein machining operations are carried out whilst said sheet of flexible substrate material is on said base board.

3. An arrangement as claimed in claim 1 or 2 and wherein said base board is a panel of fibreglass.

4. A method as claimed in claim 1 or 2 and wherein said base board is synthetic resin-bonded paper.

5. A method as claimed in any of the above claims and wherein said thermoplastic adhesive material is a photo-sensitive polymeric film.

6. A method of manufacturing a flexible printed circuit board substantially as herein described with reference to the accompanying drawing. 125

JUL. 19. 2007 9:07AM

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NO. 6802—P. 14

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Printed for Her Majesty's Stationary Office  
by Burgess & Son (Abingdon) Ltd.—1980.  
Published at The Patent Office, 25 Southampton Buildings,  
London, WC2A 1AY, from which copies may be obtained.